

Safeguarding California's Water

CAL FIRE Protects Water Quality Through Timber Harvest Monitoring

By Pete Cafferata, Forest Hydrologist, Forest Practice Program, Sacramento Headquarters

Water is often considered California's most important and controversial resource. Nearly 85 percent of California's average annual runoff is produced from forested watersheds. Improper logging practices have the potential to adversely impact water quality.

Many of the modern Forest Practice Rules (FPRs) developed by the Board of Forestry and Fire Protection to regulate logging on non-federal timberlands were passed to protect water quality from improper logging practices that regularly occurred before the mid-1970's. The FPRs are designed to keep sediment out of streams and retain trees along streams for shade and wildlife values.

CAL FIRE's Forest Practice Program regulates logging on approximately 7.3 million acres of non-federal commercial timberlands in California. CAL FIRE's Forest Practice Inspectors enforce the California Forest Practice Act and FPRs to ensure

that timber harvesting is done in a way that will protect all forest resources and water quality protection is particularly emphasized.

Monitoring forest practices is one way to ensure FPRs are working. In the past decade, the importance of forestry related water quality monitoring has increased significantly for two key reasons.

First, monitoring helps determine if federal and state listed fish species are being adequately protected. Coho salmon, Chinook salmon and steelhead trout have all been listed as threatened or endangered. Habitat protection for these species is critical to prevent extinction and maintain population numbers high enough to allow commercial and sport fishing.

Second, 90 percent of the watersheds in California's North Coast Region are listed as "impaired" by the U.S. Environmental Protection Agency because of excessive

amounts of sediment in stream channels, which adversely impact fish habitats.

CAL FIRE has funded a monitoring program since 1991 to determine if logging activities are being carried out as required by law and are effective in protecting California's water quality. The Board's Monitoring Study Group has provided guidance for the program.

After using pilot projects in the early 1990's to develop and test monitoring methods, CAL FIRE sponsored two timber harvest monitoring programs from 1996 to 2004.

above: Shane Cunningham leads an Interagency Mitigation Monitoring Program training at LaTour Demonstration State Forest.

right: Interagency training workshop on stream crossings in the Santa Cruz Mountains in 2006. Bridal Veil waterfall in Yosemite National Park.

The first effort was the Hillslope Monitoring Program (HMP), which used independent contractors to collect monitoring data from 1996 through 2002. The second program, called Modified Completion Report monitoring, used CAL FIRE Forest Practice Inspectors to collect data from 2001 to 2004.

Data was collected on high-risk hillslope locations, such as forest roads, landings, skid trails and stream crossings. Together, these projects evaluated over 600 randomly selected Timber Harvesting Plans (THPs) that had experienced one to four winter periods following the completion of logging and they produced remarkably consistent results.

The Hillslope Monitoring Program found that FPRs developed to protect water were successfully implemented 94 percent of the time. Required practices were found to be effective in preventing erosion when properly implemented.

Both monitoring programs found surface erosion was usually caused by not following the rules on forest roads or at watercourse crossings. They also found that watercourse and lake protection zones retained high levels of post-harvest tree canopy.

Monitoring at stream crossings showed that culvert plugging, caused by wood and/or sediment blocking the pipe opening, diversion potential, the chance for water to flow down a road if the culvert plugs, and road drainage,

structures near crossings, such as cross drain culverts, waterbars or dips installed to divert water off the road, are common problems. Approximately 20 percent of the stream crossings in both programs had significant rule implementation and/or effectiveness problems.

In 2000, the Board of Forestry and Fire Protection adopted a rule requiring Registered Professional Forester (RPF) supervision of active timber operations to improve rule implementation, partially in response to these monitoring results. In addition, the Hillslope Monitoring Program Report specifically recommended rules allowing landowners to use a Road Management Plan to address existing road-stream crossing problem sites, which were recently adopted by the Board.

A new Interagency Mitigation Monitoring Program began in 2005 to provide information about forest practices at high-risk sites where measures have been specially designed to protect water quality. Pilot project work focused on watercourse crossings and nearby roads that drain into crossings, since these are high-risk areas for sediment delivery into streams. Preliminary pilot project results have shown that problems are often the result of improper installation practices.

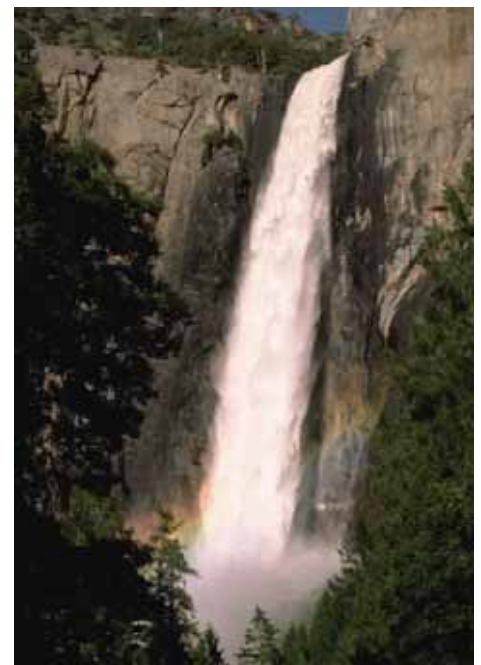
The pilot work is being conducted by two interagency teams composed of representatives from CAL FIRE, the California Department of Fish and Game, the California Geological Survey and the Regional Water Quality Control Boards.

This team approach provides a balance of interests for all of the agencies involved in the timber harvesting plan review for greater agency and public confidence in the monitoring results.

In 2007, CAL FIRE entered into the second phase of the Modified Completion Report program, now called Forest Practice Rules Implementation and Effectiveness Monitoring. CAL FIRE watershed staff members are currently training CAL FIRE Forest Practice Inspectors on updated monitoring procedures.

In addition, CAL FIRE has also supported several cooperative in-stream monitoring projects in watersheds throughout California, including: Caspar Creek in Mendocino County, where data has been collected since 1962, Garcia River in Mendocino County, South Fork Wages Creek in Mendocino County (CAL FIRE and Campbell Timberland Management), Judd Creek in Tehama County (CAL FIRE and Sierra Pacific Industries), and Little Creek in Santa Cruz County (CAL FIRE and Cal Poly-San Luis Obispo).

These instream projects are an important component of our overall water quality monitoring program. They are measuring sediment concentrations in water samples and recording the turbidity, or clarity of the water, at automated monitoring stations. This data helps provide connections between stream channel conditions and management practices occurring on hillslopes in the watershed.





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The main conclusions from all the monitoring completed to date are that California’s water quality-related rule implementation rate is among the highest of any of the Western United States, and that when properly implemented, the FPRs are effective in protecting water quality.

Monitoring results have also shown, however, that improvements are needed in watercourse crossing design, construction, maintenance and for road drainage, particularly near stream crossings.

To improve practices on roads and at stream crossings, there have been several efforts over the past five years, including the development of a guidebook on how to properly design crossings for 100-year

flood flows and the passage of wood and sediment.

In addition, CAL FIRE and other State Resource Agency departments, University of California Cooperative Extension, and professional forestry organizations have sponsored numerous workshops for foresters, landowners, and regulators on how to address road problems and how to properly design and construct road-stream crossings.

Continued monitoring will help us determine whether these training efforts have achieved our goal of water quality protection through improved practices near watercourse crossings, reducing sediment input into fish-bearing streams.

The final reports for the Hillslope Monitoring Program and the Modified Completion Report Monitoring Program are available online at:

- www.bof.fire.ca.gov/pdfs/ComboDocument_8_.pdf
- www.bof.fire.ca.gov/pdfs/MCRFinalReport_2006_07_7B.pdf

Other MSG monitoring reports and information are available at:

- http://www.bof.fire.ca.gov/board/msg_geninfo.asp.

The crossing design guidebook is available at:

- http://www.fire.ca.gov/rsrc-mgt_content/downloads/100yr32links.pdf.

above: Clay Brandow, CAL FIRE, leads Forest Practice Rules Implementation and Effectiveness Monitoring training for the CAL FIRE Nevada-Yuba-Placer Unit foresters near Georgetown.